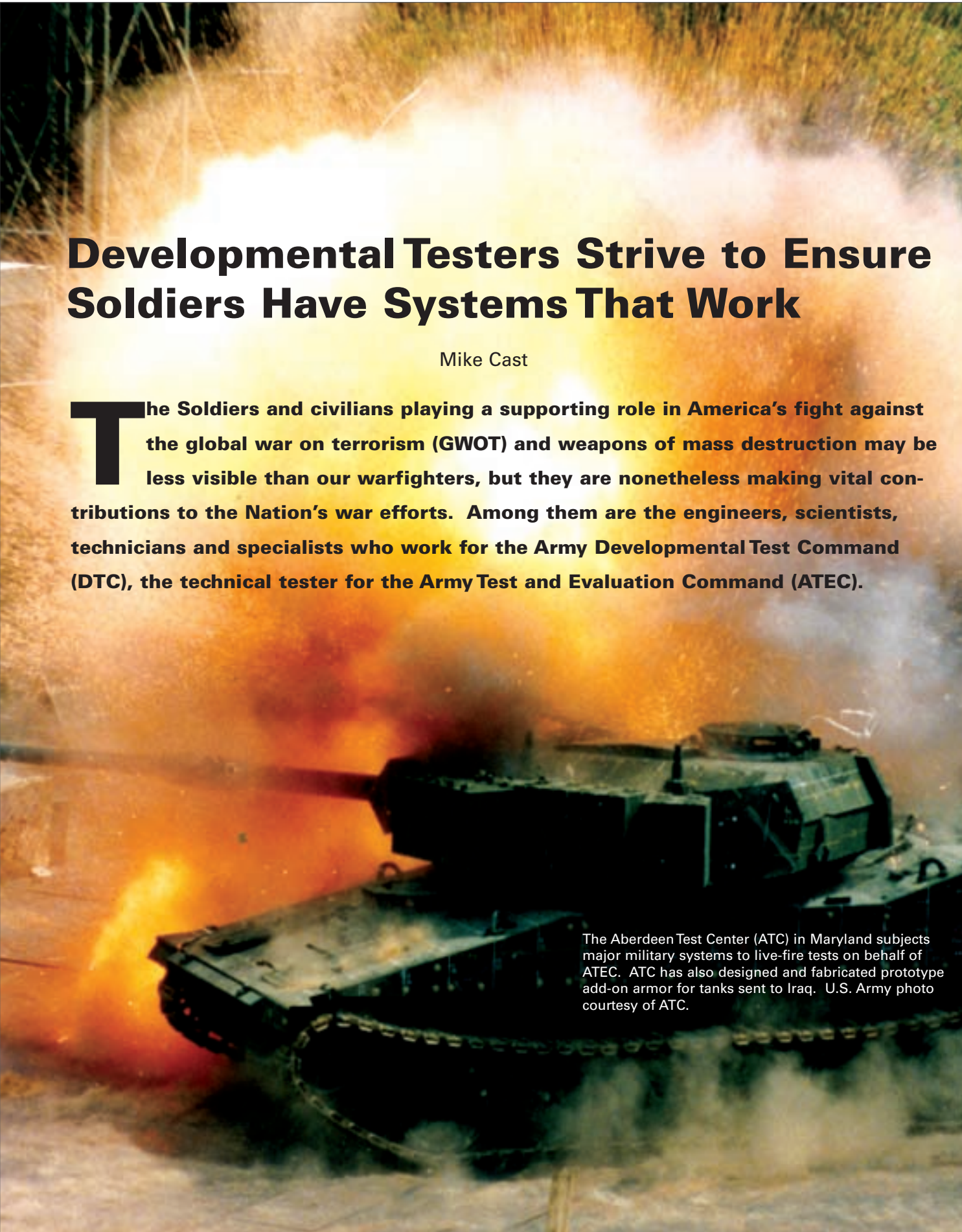


Developmental Testers Strive to Ensure Soldiers Have Systems That Work

Mike Cast

The Soldiers and civilians playing a supporting role in America's fight against the global war on terrorism (GWOT) and weapons of mass destruction may be less visible than our warfighters, but they are nonetheless making vital contributions to the Nation's war efforts. Among them are the engineers, scientists, technicians and specialists who work for the Army Developmental Test Command (DTC), the technical tester for the Army Test and Evaluation Command (ATEC).

A photograph of a tank, likely an M1 Abrams, positioned in a field. The tank is dark green and has a large, bright orange and yellow explosion or fireball erupting from its rear or side. The background is filled with tall, dry grass and a large, bright orange and yellow explosion or fireball, suggesting a live-fire test. The tank is facing left, and its turret is slightly angled towards the viewer. The overall scene is dramatic and intense, with a lot of smoke and fire.

The Aberdeen Test Center (ATC) in Maryland subjects major military systems to live-fire tests on behalf of ATEC. ATC has also designed and fabricated prototype add-on armor for tanks sent to Iraq. U.S. Army photo courtesy of ATC.

To integrate developmental testing with the testing done in the field by Soldiers in operational environments, the Army stood up ATEC in Alexandria, VA, in October 1999. ATEC manages and synchronizes DTC's test programs and its other key test organization, the Operational Test Command. ATEC's third key subordinate organization is the Army Evaluation Center. The engineers and scientists from this center assist in test planning and analyze the data from testing to provide detailed reports to key Army decision makers.

Headquartered at Aberdeen Proving Ground (APG), MD, DTC oversees diverse test centers throughout the United States, enabling the command to subject military systems to rigorous testing in a full range of natural and man-made environments. DTC tests everything from new boots to the latest precision-guided weapons, and its testers work under all weather conditions to collect and record the accurate, impartial test data that Army evaluators need to analyze system performance.

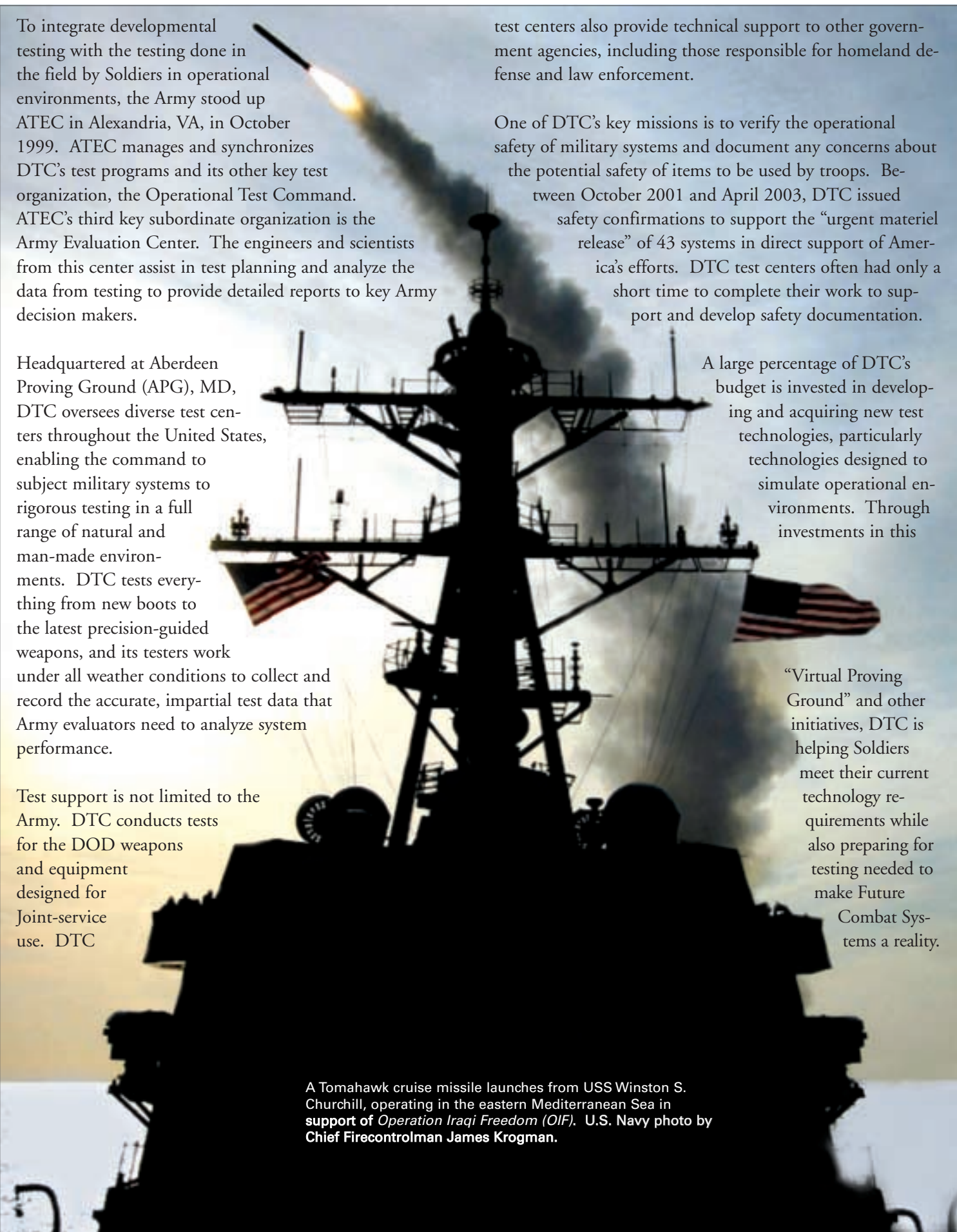
Test support is not limited to the Army. DTC conducts tests for the DOD weapons and equipment designed for Joint-service use. DTC

test centers also provide technical support to other government agencies, including those responsible for homeland defense and law enforcement.

One of DTC's key missions is to verify the operational safety of military systems and document any concerns about the potential safety of items to be used by troops. Between October 2001 and April 2003, DTC issued safety confirmations to support the "urgent materiel release" of 43 systems in direct support of America's efforts. DTC test centers often had only a short time to complete their work to support and develop safety documentation.

A large percentage of DTC's budget is invested in developing and acquiring new test technologies, particularly technologies designed to simulate operational environments. Through investments in this

"Virtual Proving Ground" and other initiatives, DTC is helping Soldiers meet their current technology requirements while also preparing for testing needed to make Future Combat Systems a reality.



A Tomahawk cruise missile launches from USS Winston S. Churchill, operating in the eastern Mediterranean Sea in support of Operation Iraqi Freedom (OIF). U.S. Navy photo by Chief Firecontrolman James Krogman.

DTC Commander BG Marvin K. McNamara cited a recent effort, the testing of Stryker slat armor, for the first Stryker Brigade Combat Team deploying to Iraq.

“The command basically conducted an integrated Stryker developmental approach. During the last 18 months, our test centers have operated in a battle rhythm, working two 10-hour shifts a day, 6 days a week,” he explained. “When requested, testers have worked above and beyond that to support the Army’s effort to rapidly deploy the initial Stryker brigade in support of *OIF*.”

Aberdeen Test Center

Since World War I, the Army has tested weapon systems at APG. At APG, where the forerunner of today’s modern computer was once used to calculate firing tables, DTC’s ATC employs expert scientists, engineers and technicians to test major combat vehicle systems, munitions, small arms, uniform components, tents and vessels used by the Navy and Marine Corps. The M1A1 Abrams tank and Bradley Fighting Vehicle both underwent extensive developmental testing at ATC.

As the Army geared up for *OIF*, ATC provided a wide range of technical support that contributed substantially to the war effort, and ATC technical experts continue to support ongoing operations today.

When an Abrams tank armor vulnerability was discovered, ATC quickly designed, fabricated and tested prototype add-on armor. ATC’s team developed and fabricated an armor enhancement concept in only 7 days. The 3rd Infantry Division (3ID) found it needed to enhance the situational awareness (SA) and communications between tank commanders using the Force XXI Battle Command Brigade and Below (FBCB2) communications system. The Blue Force Tracker — a satellite-based FBCB2 system — was added to 3ID tanks to meet this need. ATC extensively tested the system to ensure it would not be adversely impacted by electromagnetic interference while also certifying the equipment’s safe operation. ATC conducted electromagnetic interference testing of additional radios placed in a 1st Armored Division (1AD)

brigade commander’s M1A1 command track. ATC technicians traveled to Germany to help modify the commander’s tank. Other 1AD brigade commanders would use vehicles outfitted with similar equipment.

The Army’s System Enhancement Package for the Abrams M1A2 tank included new software for the tank’s nuclear, biological and chemical protection system. Software improvements to FBCB2 databases and maps of Iraq were included in the package, tailored to the 4th Infantry Division’s (4ID’s) and 1st Cavalry Division’s mission-specific needs. ATC also tested and certified this software for field use.

ATC received a contract to fabricate 16 containers used to

transport spare vehicle power packs around the world. Its welding and machine shop copied the designs of existing containers, ordered the needed materials and quickly began fabricating the containers when the materials arrived.

ATC’s Support Equipment Team tested the Improved Ribbon Bridge, which was de-

ployed with military units in February 2003 to support *OIF* operational maneuver. The team also tested the Dry Support and Wolverine bridges for deploying across gullies and low spots in the Iraqi desert.

White Sands Testing

The Tularosa Basin in New Mexico, a vast tract of land surrounding White Sands National Monument, is home to DTC’s White Sands Missile Range (WSMR). The range has a long history of conducting missile and rocket tests for the Army, DOD, U.S. allied forces and even NASA. In preparation for recent military operations, White Sands tested an array of critical systems including the Multiple Launch Rocket System (MLRS), the PATRIOT Advanced Capability-3 (PAC-3) missile, Joint Direct Attack Munitions and Army Tactical Missile System.

“White Sands has made a tremendous contribution toward fighting the war on terrorism, war in general and homeland security,” said BG William Engel, a former WSMR commander. “The credit for that has to go to the 3,500 civilian



A Wolverine launcher performs a launch and retrieval exercise after maintenance services at Camp Boom, Baquba, Iraq. Photo by Ronny Anthony, Field Service Representative for General Dynamics Land Systems.



DTC's WSMR tested munitions and missiles used in *OIF*, including the PAC-3 missile. Photo courtesy of WSMR.

and contractor employees who work every day out here on the range. The workforce has performed magnificently, and people should know that.”

The PATRIOT missile's improved effectiveness since the Gulf War in 1991 is due in large part to testing that took place at WSMR. Some tests involved the simultaneous launch of multiple missiles and targets, a technically complex feat that WSMR technicians accomplished in coordination with numerous participating organizations and local authorities.

The Navy's Tomahawk cruise missile, first launched from Navy vessels offshore during the 1991 Gulf War, has been aggressively tested at WSMR. Many Navy weapon systems have been launched from the “USS Desert Ship,” a totally land-based missile-launch facility at WSMR that resembles a real ship.

White Sands has even used Scud missiles in tests, enabling U.S. military planners to clearly understand the Scud threat. Testers continually worked on improving missile detection and delivery systems, giving U.S. forces an overwhelming missile-defense edge over Iraq.

In the GWOT, White Sands' Aerial Cable Range, the largest unsupported cable span in the world, was used to test an air-defense system that would enable large aircraft to detect and avoid attacks from shoulder-launched missiles. Suspended between two mountain peaks, the cable provides a path for target vehicles that can weigh up to 20,000 pounds. It is used to test bombs, sensors, missiles, prototype aircraft, electronic equipment and munitions smaller than missiles.

The U.S. Army Training and Doctrine Command has used White Sands test facilities to conduct computer modeling and simulation for disaster control. Likewise, the Defense Threat Reduction Agency has used facilities there to test bunkers against car and truck bombs.

Testing at Redstone

Redstone Arsenal, AL, is home to DTC's Redstone Technical Test Center (RTTC), which has the expertise and technical capabilities to test a wide variety of missiles — including the Javelin and Hellfire — both used during *OIF*. RTTC tested two Hellfire versions for use on the Predator unmanned aerial vehicle. The launchers for this missile were also tested at RTTC and modified to fix a launch mechanism problem.

During range training, a Hellfire missile went off-course, prompting the Army to require larger danger zones for Hellfire missile firing. RTTC modeling, simulation and testing determined the errant missile's root cause. Follow-on testing resulted in approval to use the missile at other training ranges, with some restrictions.

RTTC also conducted product-assurance testing of repair parts for missiles. About 10 percent of the parts tested in 2003 were in the “war-expedite” category. Although RTTC testers generally test some items designated as critical, the war in Iraq caused a surge in expedited testing.

RTTC also conducted electromagnetic effects testing on Blue Force Tracking for UH-60, CH-47 and AH-64 helicopters, enabling these types of aircraft to be declared airworthy and deploy to the Iraq theater of operations. U.S. aviators benefited from real-time SA by tracking the location of friendly forces despite blowing sands and blackout conditions.

RTTC also deployed surveillance vans to Kuwait to check performance parameters on Stinger, Javelin, Hellfire and MLRS missiles. This was required to assess stockpile

readiness, while returning some missiles to the Army's inventory and removing others.

RTTC testers also conducted essential testing to deploy the Army Airborne Command and Control System for *OIF*. In May 2003, they completed safety-of-flight and electromagnetic compatibility testing on system components. The test schedule was compressed by a year to meet Army operational requirements. During testing, several problems were pinpointed and redesign efforts initiated. As a result, two prototype systems were available for use in Iraq. RTTC has conducted additional airworthiness testing on the system, and full system qualification testing will continue throughout FY04.

Electronic Testing

DTC's Electronic Proving Ground (EPG) at Fort Huachuca, AZ, is the Army's test center for command, control, communications, computers, intelligence, surveillance and reconnaissance (C4ISR). EPG plays a crucial role in military operations by rigorously testing systems that will enable U.S. forces to dominate the electromagnetic spectrum.

During the first quarter of FY03, EPG was tasked to provide support to soldiers deployed to Camp Doha, Kuwait. To support the mission, EPG engineers developed compatible C4I networks using systems already in Kuwait as well as newly deployed C4I systems. These modifications required extensive work in an EPG laboratory during a compressed testing period.

EPG was asked to support the 4ID at Fort Hood, TX, before the unit deployed. EPG's Fabrication Facility at Fort Hood overhauled several tactical operation centers for 4ID, meeting the division commander's specifications before the unit deployed. Two technicians from this facility were sent to Iraq to provide technical assistance on location once the division deployed.

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EPG testers completed electromagnetic compatibility safety checks on the Bradley Command-on-the-Move vehicle at Yuma Proving Ground (YPG), AZ, in January 2003 and at Fort Hood in March 2003. Testers also completed intra-system electromagnetic compatibility and safety tests on Bradley Fighting Vehicles at Yuma and Fort Hood. These short-suspense evaluations were needed for safety releases on vehicles that had already deployed.

EPG played a role in the final customer test for the semi-active laser Brilliant Antitank Munitions in February 2003.

Earlier tests revealed deficiencies with a laser system component.

YPG also supported missile system safety checks in March 2003 and software development for an 11th Signal Brigade communication network.

Testing at Dugway

The West Desert Test Center at Dugway Proving Ground (DPG), UT, tests chemical and biological protective systems for the Army and its sister services. The rigorous testing at DPG ensured that U.S. Forces in Iraq and elsewhere would have the best chemical and biological protection available.

Concerned about troop safety, the U.S. Central Command issued an "urgent need statement" for a new decontaminant to replace one that was already fielded. DOD began testing at DPG to determine if a foam product developed by Sandia National Laboratory could serve as an effective replacement. In November and December 2002, DPG testers used chemical warfare agents and a biological warfare agent simulant to challenge the replacement decontaminant's effectiveness. DPG also tested protective clothing to determine if new decontaminants would affect its performance.



Soldiers from B Company, 1st Squadron, 4th Cavalry Regiment, Schweinfurt, GE, provide security in their M1A1 Abrams Main Battle Tank at a remote location during a training exercise, March 23, 2004. U.S. Army photo by PV2 Brandi Marshall.

The Marine Corps Systems Command (MARCORSYSCOM) was concerned that a new decontamination system might hinder the detection capabilities of fielded chemical agent detectors. The MARCORSYSCOM Program Manager (PM) for Nuclear, Biological and Chemical Defense expressed an “urgent operational requirement” for an interim chemical and biological agent decontaminant. DPG conducted a series of tests to evaluate this decontaminant’s use in conjunction with several chemical and biological detectors and chemical warfare agents.

As *OIF* offensive operations began, a test program — the Joint Service Additional

Source Qualification — was underway at DPG to determine alternate production sources for materiel used in chemical protective suits. Manufacturers provided new suits, and DPG conducted stringent tests to determine their effectiveness.

More recently, DPG technicians were asked to verify the performance of drink tubing in protective systems used by troops. Testers exposed the tubing to nitric acid and then chemical warfare agents to determine if it still offered full protection after exposure to corrosive materials.

DPG specialists have also provided a variety of technical support to government and law enforcement agencies to bolster America’s homeland defense. The Army National Guard’s Weapons of Mass Destruction Civil Support Teams are trained to assist local authorities in the event of an attack. DPG has provided these teams a training base for the last several years.

DPG’s Meteorology Division has been testing a new component of its Four-Dimensional Weather System — a capability called Global Meteorology on Demand (GMOD). GMOD employs a weather model developed jointly by

Pennsylvania State University and the National Center for Atmospheric Research to provide forecasts anywhere in the world on short notice. For troops in Iraq, the GMOD system yielded high-resolution analyses of current conditions and 24-hour forecasts updated every 3 hours. The output included information used by the Defense Threat Reduction Agency to predict and assess potential hazards.

Arizona Desert Testing

YPG, home to the Yuma Test Center, tests systems in harsh desert climates. Technicians at YPG are heavily involved in a variety of tests to support U.S. military operations in Iraq.

Before newly manufactured ammunition is shipped to troops, samples are tested at YPG’s

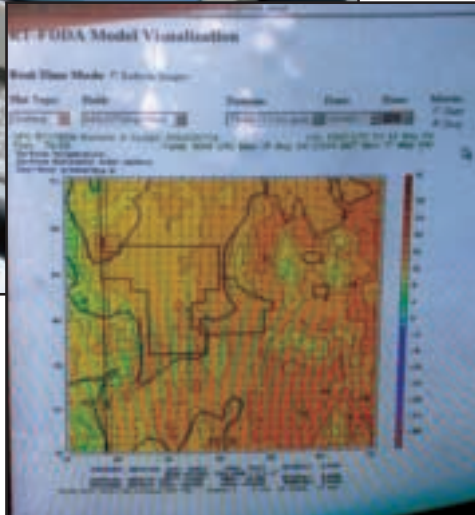
firing ranges. YPG tested the XM983 and the XM930 120mm infrared illuminating cartridges and expedited a recommendation for a safety confirmation to support the “full materiel release” of the XM983. Days before the start of the actual ground war in Iraq, YPG testers conducted a rapid-turnaround lot-acceptance test of these projectiles, working around the clock to get the testing done. They also expedited the safety confirmation recommendation for the XM930 cartridge.

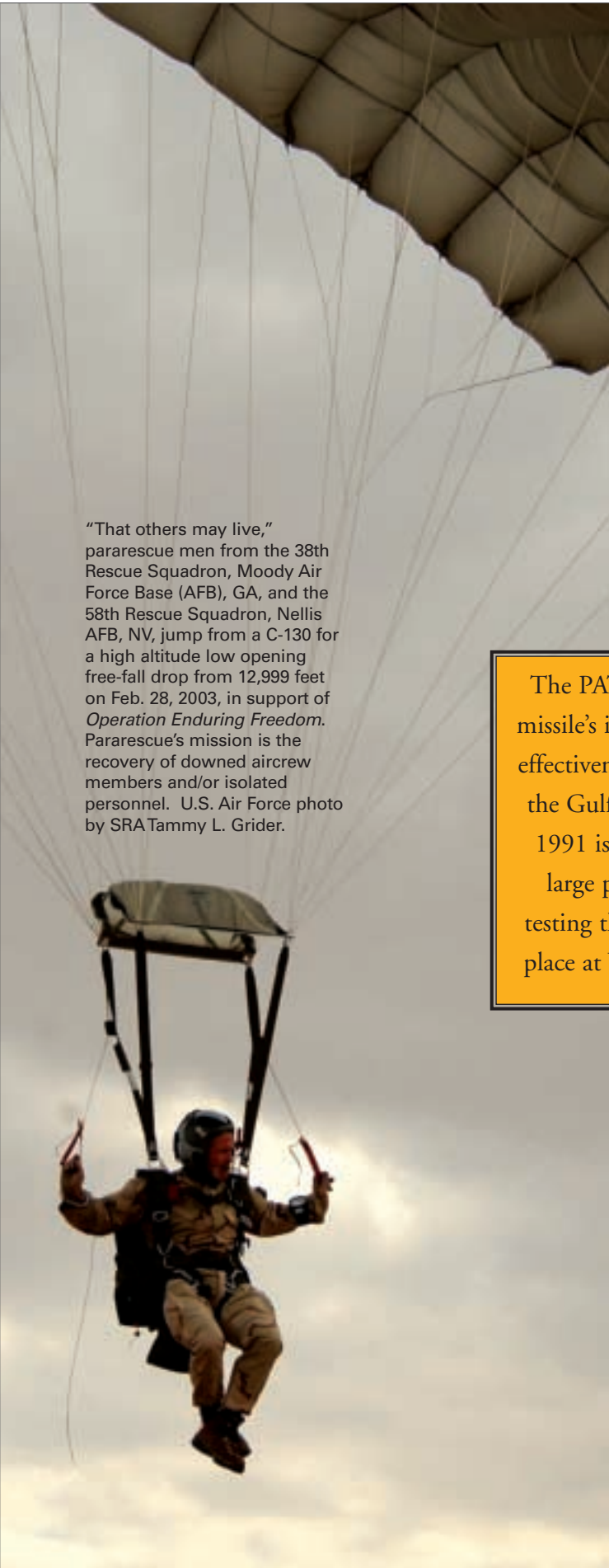
YPG also tested the Hellfire missile for Apache attack helicopters. The tests were completed in less than 7 hours on the same day YPG was contacted for support. Within another 4 hours, the tests prompted enhancements to Apache helicopters already deployed to the theater of operations.

YPG testers also assisted the U.S. Marine Corps (USMC). YPG technicians tested the M198 towed howitzer to identify problems occurring during high-zone elevation firing. YPG test results helped the PM fix the problem on the same day as the testing.



Above, DPG Chief Forecaster Susan Krippner analyzes a Four-Dimensional Weather System computer model. At right, a Real-Time Four-Dimensional Simulation Model Visualization. U.S. Army photos by Al Vogel.





"That others may live," pararescue men from the 38th Rescue Squadron, Moody Air Force Base (AFB), GA, and the 58th Rescue Squadron, Nellis AFB, NV, jump from a C-130 for a high altitude low opening free-fall drop from 12,999 feet on Feb. 28, 2003, in support of *Operation Enduring Freedom*. Pararescue's mission is the recovery of downed aircrew members and/or isolated personnel. U.S. Air Force photo by SRA Tammy L. Grider.

The PATRIOT missile's improved effectiveness since the Gulf War in 1991 is due in large part to testing that took place at WSMR.

YPG is also an excellent training facility. Dozens of Special Forces (SF) units use its rugged desert terrain to train for military operations in similar topographies and climates. The U.S. Special Operations Command's Military Freefall School at YPG trains students from all services in advanced free-fall parachuting techniques. Many of the Army's SF troops have received this specialized training and put their skills to the test in numerous challenging environments overseas. Likewise, USMC engineers used a Colorado River training site at YPG to prepare for combat bridge building across rivers in Iraq.

Army Aviation Testing

While U.S. ground forces slugged it out with their Iraqi foes, Army aviation gave our Soldiers a decisive battlefield edge. The Aviation Technical Test Center (ATTC) at Fort Rucker, AL, is DTC's technical tester for aircraft and aviation systems. ATTC manages a "lead-the-fleet" program to confirm the safety of aircraft already in the Army's inventory and the safety of any equipment upgrades.

To ensure friendly force battlefield safety, the Army tested integrating the Grenadier Beyond-Line-of-Sight Reporting and Targeting System with the Blue Force Tracking System in UH-60A/L helicopters. ATTC testers supported material release by gathering data needed to confirm this system's safety. ATTC also conducted safety testing on the UH-60A/L with the Airborne Agent Detection System installed and issued a recommendation for safety confirmation.

Further, ATTC tested a targeting and navigation system for an AH-64A Apache attack helicopter that was equipped with the Embedded Global Positioning System, Inertial Navigation System. The test team conducted tests with differing configurations of navigation enhancements to demonstrate the attack helicopter's performance.

ATTC pilots tested AH-64D's handling qualities under instrument meteorological conditions — weather that requires the use of instruments because of reduced visibility. They also tested the AH-64D's handling when flying by instrument flight rules under weather-reduced visibility.

Other AH-64D tests included the new internal auxiliary fuel system's form, fit and function and the compatibility of an external 230-gallon auxiliary fuel tank with the new fuel system. ATTC testers assessed the safety of the system so it

could be fielded. In addition, the test team conducted preliminary airworthiness evaluations on the CD-12 aircraft designed for foreign counterintelligence. The test collected data on the aircraft's handling qualities and was used to complete a limited performance validation to substantiate the aircraft's airworthiness — steps needed to recommend a safety confirmation before the CD-12 can be fielded.

Employees Deploy

To support U.S. military operations overseas and homeland defense stateside, 19 DTC employees have been activated for service in U.S. Army Reserve or Army National Guard units. Additionally, four DTC civilian employees have deployed to assist with military operations overseas.

McNamara summed it up by giving credit to soldiers and civilians alike. "Heroes of the war come in many forms. There are those risking their lives on point for our Nation and those saving the lives of Soldiers by executing quick-turnaround testing activities," he remarked. "DTC had numerous heroes who significantly contributed to preserving the lives of our Soldiers, Sailors, Airmen and Marines. DTC heroes adapted a 24/7 selfless mindset to ensure our Soldiers had the best possible capabilities," McNamara concluded.

For more information about DTC test programs and capabilities, go to www.dtc.army.mil.

The rigorous testing at DPG ensured that U.S. forces in Iraq and elsewhere would have the best chemical and biological protection available.

MIKE CAST is a Public Affairs Specialist with the Army DTC at APG. He has a B.A. in journalism from Arizona State University. For more than 20 years, Cast has held various Army positions in writing, editing and photography.

